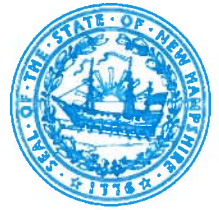




The State of New Hampshire
Department of Environmental Services



Clark B. Freise, Assistant Commissioner

January 18, 2017

The Honorable Carol McGuire, Chair
Executive Departments and Administration Committee
Legislative Office Building, Room 306
Concord, New Hampshire 03301

Re: House Bill 92, relative to revising the definition of the state building code and ratifying changes to the state building code adopted by the state building code review board

Dear Chair McGuire and Members of the Committee:

Thank you for the opportunity to testify on House Bill 92. This bill updates the definition of the state building code in RSA 155-A:1 to include the 2015 editions of the International Building Code (IBC) and several other codes, including the 2015 International Residential Code (IRC) and the 2015 International Energy Conservation Code (IECC). The bill also ratifies changes to these codes that were adopted by the state Building Code Review Board (BCRB). The New Hampshire Department of Environmental Services (NHDES) strongly supports the updates to the definition of the state building code and the majority of changes to the codes adopted by the BCRB. NHDES takes no position on the majority of the amendments to the 2015 IRC, but supports removing the subset of amendments to the 2015 IRC in HB 92, found in Section 4, Paragraph VI, that directly affect the energy-efficiency measures of the 2015 IECC.

These IRC amendments reduce the energy-efficiency of new and retrofit residential buildings by weakening or eliminating certain requirements including insulation and air-sealing measures. A list of the amendments of concern are included in Attachment A. The end result is that a home built to the amended 2015 code would have little or no improvement in energy efficiency compared to the current New Hampshire building code (the 2009 IECC). As the BCRB will next consider updates to the NH building code in 2021, ratification of the energy-efficiency-related amendments will mean that homes built or retrofit between 2009 and 2021 will possess similar levels of energy efficiency. It is estimated that single-family homes built to the amended code between now and 2021 will: forgo more than \$500 per year in avoided energy cost savings, possess lower building comfort and durability, and result in higher emission of energy-related pollution. These forgone benefits could have been affordably achieved at the time of building construction or renovation.

The energy-efficiency amendments were adopted on concerns regarding the ability of builders to construct to the new code, the training needed for code enforcement officials to enforce the new code, and the relative cost to meet the code requirements. NHDES does not concur with the information that was presented related to the upfront cost of the energy-efficiency measures. That

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information projected additional construction costs ranging from \$2,100 to \$8,900, depending on the location of the project in the state (i.e., located in southern NH, zone 5, or northern NH, zone 6). By comparison, the US Department of Energy's (US DOE) estimates that complying with the new code requirements for a single-family home will add \$1,450 dollars in construction costs in the southern portion of the state and \$2,430 dollars in the northern part of the state.

The US DOE analysis further shows that a family could expect an average reduction in energy consumption of 30 percent.¹ Using US DOE's model and applying conservative (low) energy costs, a reduction in energy use of 30 percent in a single-family home located in the southern tier of the state could reduce annual energy costs by \$500,^{1,2} and \$640 in the northern tier of the state,² meaning that the energy-cost savings achieved will result in cash positive situations that pay for the energy efficiency measures in just three to four years.³ Over a 30-year period, building to the 2015 IECC is projected to reduce energy costs for single-family homeowners by an estimated \$15,100 to \$19,200.^{1,2} As energy prices rise, which they have done since this analysis, the energy cost savings will continue to increase.

Energy efficiency measures also have a direct, positive impact on public health and the quality of our natural environment. Reducing energy demand leads to lower emissions of smog-forming compounds and particle pollution that cause direct health impacts, mercury emissions that poison our lakes and streams, and greenhouse gas emissions that contribute to climate change.

In order to achieve the greatest reduction in energy use and associated energy costs, NHDES suggests consideration of a wait-and-see approach regarding the IRC amendments that affect the residential building energy codes. These amendments were adopted by the BCRB in February 2016 so, pursuant to RSA 155-A:10, they will remain in effect until February 2018. This one-year period provides an opportunity for builders and code officials to gain knowledge and experience to comply with the 2015 code, and for the State of New Hampshire to gather further information on relative costs and benefits of the 2015 IECC. The Town of Durham may serve as a pilot as it has already adopted the 2015 IECC for both residential and commercial buildings and has been enforcing this code since 2015. If, in one year, the BCRB determines that it is in the best interest of New Hampshire residents to provide additional time to prepare for the 2015 building energy code, they could re-adopt the amendments and provide builders and code officials an additional two-year extension. Alternately, the General Court could, at that time, elect to make the amendments permanent. Either path will be based on substantially more information than what is available today. Ratification of the energy-related 2015 IRC amendments by the General Court at this time is premature.

¹ US DOE (2015). *National Cost-Effectiveness of the Residential Provisions of the 2015 IECC*, Pacific Northwest National Labs, https://www.energycodes.gov/sites/default/files/documents/2015IECC_CE_Residential.pdf.

² This assumes \$1.96/gallon of heating oil, \$0.89/therm of natural gas, and \$0.16/kWh. Information was obtained from the NH Office of Energy and Planning "Fuel Prices" website, <http://www.nh.gov/oep/energy/energy-nh/fuel-prices/index.htm> on February 25, 2016.

³ US DOE (2015). *Cost-Effectiveness Analysis of the Residential Provisions of the 2015 IECC for New Hampshire*, Pacific Northwest National Labs, https://www.energycodes.gov/sites/default/files/documents/NewHampshireResidentialCostEffectiveness_2015.pdf.

Thank you again for the opportunity to comment on HB 92. Should you have further questions or need additional information, please feel free to contact either Craig Wright, Director of the Air Resources Division (271-1108, craig.wright@des.nh.gov) or Rebecca Ohler, Administrator of the Technical Services Bureau (271-6749, rebecca.ohler@des.nh.gov).

Sincerely,



Clark B. Freise

Assistant Commissioner

cc: Sponsors HB92: Representatives Roberts, Goley, H. Moffett, Shepardson, Mann, M. MacKay, LeBrun, Senator Feltes

Attachment A - List of Amendments to the 2015 International Residential Code with Energy Efficiency Impacts

NHDES Testimony on House Bill 92, relative to revising the definition of the state building code and ratifying changes to the state building code adopted by the state building code review board

2015 International Residential Code (IRC) Amendment	Explanation	Proposed Cost Impact To Meet the Proposed Measure	Amendment
Section N1101.5 Information on Construction Documents	This amendment deletes the requirement that construction documents shall include details related to the energy systems.	\$1,000	RE-15-17-16
Section N1101.5.1 Thermal Envelope	This amendment deletes the requirement that construction documents shall include details related to the buildings thermal envelope.	Indeterminate	RE-15-18-16
Section N1102.1.2 Insulation and Fenestration Requirements by Component	This amendment reduces the insulation requirement in the 2015 IRC/IECC to the 2009 levels for wood frame homes in the northern 2/3rd of the state. The net effect is to allow a higher rate of heat loss and higher energy bills over the life of the home.	\$4500 upfront cost (Zone 6 - Northern 2/3 of state)	RE-15-20-16
Section N1102.4.1.2 Testing	This is the first year that testing how the air tight of a building would be mandatory. This amendment reduces the air sealing requirement in the 2015 IRC/IECC from 3 air changes per hour to 7. As air sealing gives the biggest bang for the buck in reducing energy required to heat a house, this is a significant reduction in efficiency.	\$2000-\$3000 (heat recovery ventilator) \$700-\$1000 (fan) + loss of heat	RE-15-21-16
Section N1103.3.4 Duct Leakage	The amendment returns the HVAC duct leakage rate to 2015 IRC/IECC to the 2009 levels. While the air leaks do occur within the conditioned space of the building, by allowing air to leak from ducts, less cool air in summer and warm air in winter is delivered to the correct destination, requiring longer HVAC appliance run times and therefore higher energy bills.	\$400	RE-15-22-16
Section N1103.6 Mechanical Ventilation	This amendment eliminates the need for mechanical ventilation in homes. With the reduction in building tightness (item # 2), it is argued that there is less of a need to mechanically ventilate a home in order to draw in fresh air as the building will allow moisture and air borne toxins to leak out and fresh air to enter. However, failing to control the path of this ventilating warm, moist air in the cooler months can allow condensation inside the building and allow mold to grow. Installing heat recovery ventilators, though associated with an upfront cost, can draw out the stale air and warm the incoming fresh air, resulting in a healthier home that uses less energy.	Costs same as 15-21-16	RE-15-23-16

Amendment	Link
RE-15-17-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-17-16.pdf
RE-15-18-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-18-16.pdf
RE-15-20-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-20-16.pdf
RE-15-21-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-21-16.pdf
RE-15-22-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-22-16.pdf
RE-15-23-16	https://www.nh.gov/safety/boardsandcommissions/bldgcode/documents/re-15-23-16.pdf

Attachment B – Background Document on Adoption and Impact of Amendments to the 2015 International Residential Code with Energy Efficiency Impacts

House Bill 92 updates the definition of the state building code in RSA 155-A:1 to include the 2015 editions of the International Building Code (IBC) and several other codes, including the 2015 International Residential Code (IRC) and the 2015 International Energy Conservation Code (IECC). The bill also ratifies changes to these codes that were adopted by the state Building Code Review Board (BCRB). NHDES takes no position on the majority of the amendments to the 2015 IRC, but does not support the subset of amendments to the 2015 IRC that directly affect the energy efficiency measures of the 2015 IECC (see Attachment A for list). The amendments present substantial missed opportunities to avoid significant energy costs and benefit from improved comfort and building health.

Currently, the state building energy code is benchmarked to the 2009 International Energy Conservation Code (IECC). With the development of new materials and technologies and a growing understanding of building science, the efficiency of buildings, as well as the comfort and health of buildings, increases with each iteration of the IECC. The BCRB typically reviews updated codes on a six year cycle instead of the three year international code cycle, therefore, New Hampshire did not evaluate or adopt the 2012 IECC. In accordance with RSA 155-A:10, the BCRB conducted an in-depth evaluation of the suite of the 2015 codes addressed by HB92 and, in the fall of 2015, unanimously recommended their adoption by the NH General Court. It is anticipated that the next suite of codes that will be considered for adoption in New Hampshire will be the 2021 codes.

In the spring of 2016, the BCRB was presented with proposed amendments to the 2015 IRC that weaken the energy-efficiency requirements for new and retrofit residential buildings, by eliminating certain energy-efficiency requirements including insulation and air-sealing measures in residential buildings. The end result is that a home built to the amended 2015 code would have little or no improvement in building efficiency over the current 2009 code. This will negatively affect energy costs, building comfort and durability, and the emission of pollution associated with energy use over the life of the residence.

The proposed amendments were based on concerns regarding the ability of builders to construct to the new code, the training needed for code enforcement officials to enforce the new code, and the relative cost to meet the code requirements. Information was presented to the BCRB related to the upfront cost of the energy-efficiency measures. That information projected additional construction costs ranging from \$2100 to \$8900, depending on the location of the project. As discussed below, these projected costs are as much as three times higher than those projected by the US Department of Energy (US DOE). These amendments were ultimately adopted by the BCRB. Pursuant to RSA 155-A:10, adoption of amendments to the code by the BCRB are immediately effective, but expire at the end of two years unless ratified by the General Court.

US DOE analysis of the impact of the 2015 IECC, if fully implemented, as compared to the 2009 IECC, shows that building occupants in New Hampshire could expect an average reduction in energy

consumption of 30 percent in single-family homes, 19 percent in multifamily homes,¹ and 20 percent in commercial buildings.^{2,3} Using US DOE's model and applying conservative (low) energy costs, a reduction in energy use of 30 percent in a single-family home located in the southern tier of the state could reduce annual energy costs by \$500.^{1,4} In the northern tier of the state, the average homeowner could expect to avoid \$640 in annual energy costs.⁴ By comparison, the US DOE estimates that complying with the new code requirements for a single-family home will add \$1,450 dollars in construction costs in the southern portion of the state and \$2,430 dollars in the northern part of the state, which roughly one-third the cost of the inclusion of the energy-efficiency measures eliminated by the amendments as presented to the BCRB. Therefore, the energy cost savings achieved by building to the 2015 IECC as compared to the 2009 IECC will pay for the measures in just three to four years. Over a 30-year period, building to the 2015 IECC would reduce energy costs for single-family homeowners by an estimated \$15,100 to \$19,200,^{1,4} as well as increases the comfort of their home. As energy prices rise, which they have done since this analysis, the energy cost savings increase and the investment pays for itself in less than three to four years.

The 2015 IBC are designed with the recognition that buildings are complex systems and, therefore, the various components of the code are designed to work together. Consequently, if one energy-efficiency measure is relaxed, it may impact the effectiveness of other measures and lead to increased energy costs. While some New Hampshire residents have the means to pursue a custom built home, the majority of residents that commission a new home or commercial building know very little about energy-efficient codes and they rely on the laws and standards of the State to ensure that buildings are durable, safe and as energy efficient as is economically possible. In order to realize the full benefits of the 2015 IECC, and provide residents with the full benefits afforded in the code, it should be adopted as initially designed. As noted in the New Hampshire 10-Year Energy Strategy, developed by the legislative State Energy Advisory Council in 2014, *"Every building that is constructed in an inefficient manner is a lost opportunity to keep more of our energy dollars in state, and retrofitting a building later costs more than building it efficiently from the start."*⁵

Energy efficiency measures also have a direct, positive impact on public health and the quality of our natural environment. Reducing energy demand leads to lower emissions of smog-forming compounds and particle pollution that cause direct health impacts, mercury emissions that poison our lakes and streams and greenhouse gas emissions that contribute to climate change.

¹ US DOE (2015). National Cost-Effectiveness of the Residential Provisions of the 2015 IECC, Pacific Northwest National Labs, https://www.energycodes.gov/sites/default/files/documents/2015IECC_CE_Residential.pdf.

² US DOE (2013). Energy and Energy Cost Savings Analysis of the IECC for Commercial Buildings, Pacific Northwest National Labs, http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22760.pdf.

³ US DOE (2015). Energy and Energy Cost Savings Analysis of the 2015 IECC for Commercial Buildings, Pacific Northwest National Labs, https://www.energycodes.gov/sites/default/files/documents/2015_IECC_Commercial_Analysis.pdf.

⁴ This assumes \$1.96/gallon of heating oil, \$0.89/therm of natural gas, and \$0.16/kWh. Information was obtained from the NH Office of Energy and Planning "Fuel Prices" website, <http://www.nh.gov/oep/energy/energy-nh/fuel-prices/index.htm> on February 25, 2016.

⁵ NH OEP (2014). New Hampshire 10-Year Energy Strategy, <https://www.nh.gov/oep/energy/programs/documents/energy-strategy.pdf>, pp. 32.

As noted, the IBC is updated every three years and it expected that future energy codes will further improve building energy efficiency. The BCRB has stated that it plans to wait until the 2021 IBC is released before considering another update to the definition of the state building code. Should the energy-related amendments to the 2015 IRC be adopted and made permanent, then all homes that are built to the energy code during the next five years will miss out on advanced energy savings over the life of the building. Further, by effectively keeping New Hampshire's building energy code at the level of the 2009 IECC, it could be even harder to meet the next generation of building energy codes as the learning curve for code officials and builders will be even steeper.

